ABSTRACT

THESIS: Whole Body Vibration and Drop Landing Mechanics

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Whole body vibration (WBV) is a training modality that involves an individual standing on a plate that provides vibrations at multiple frequencies and amplitudes. Improvements in muscular concentric force production such as power and strength have been extensively studied, however little work has been conducted looking at the effects of WBV on eccentric actions. The landing phase of a jump is an eccentric mechanism to decelerate the body as it prepares to stop or initiate another movement. This study sought to identify the effects of WBV on ground reaction forces, loading rates, valgus knee angles, frontal plane knee moment and jump height, as well as a higher order interaction between gender and time as a result of the vibration. An individualized frequency WBV protocol was utilized as 10 female and 9 male subjects completed drop jumps pre-vibration, post vibration and at 10 and 20 minutes post vibration. Baseline valgus knee angle increased 0.857 degrees post vibration, while remaining increased by 0.917 and 1.189 degrees at the 10 and 20 minute post vibration time intervals, respectively. Repeated measure ANOVA's revealed that valgus knee angle significantly ($p=0.011$) increased post vibration. Gender comparisons revealed that females had a significantly greater knee moment ($p=0.038$) and males significantly jumped higher than females ($p<0.001$). As an end result following WBV, the

subjects landed in significantly greater knee valgus, regardless of sex. Since it has been demonstrated that a knee in a valgus position increases the potential risk for anterior cruciate ligament injury, caution should be taken when combining WBV and jump training protocols.